Aircraft radar station TsD-ZOT

10. Coordinate stabilization unit.

11. Antenna control unit.

12. Control unit.

13. Connection box.

14. Block of protection against asynchronous impulse noise.

15. Block for height correction.

The station is operated by the following devices:

1. Height sensor.

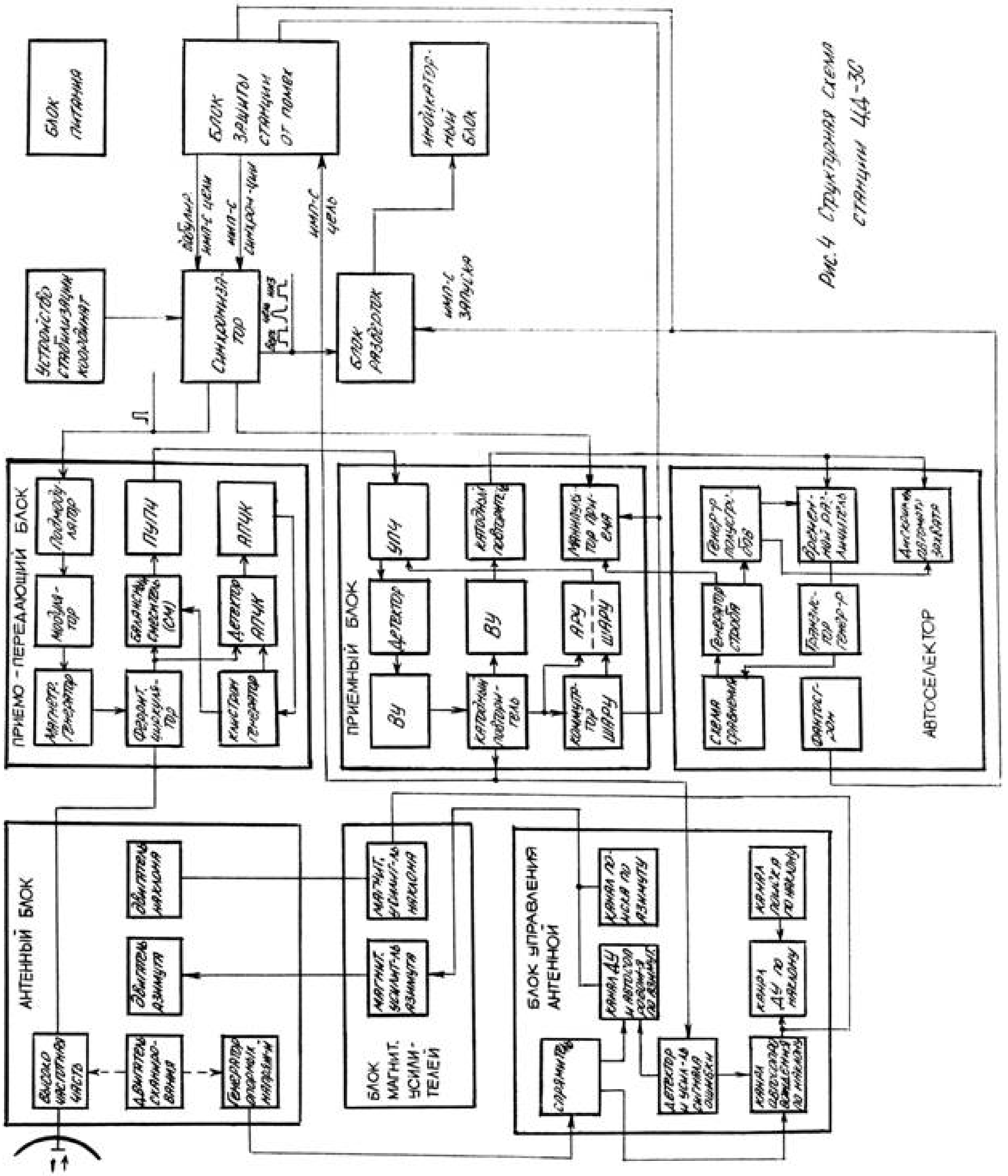
2. Converter 36V 400 Hz PG-200.

When working in ground conditions, a ground control panel is used.

4. BRIEF DESCRIPTION OF THE STRUCTURAL DIAGRAM OF THE PLANT

The block diagram of the TsD-ZOT station is shown in Fig. 4.

Antenna unit - serves for the emission and reception of high-frequency signals, as well as for the formation of radiation patterns. The beam scanning engine, the reference voltage generator, and the azimuth and elevation control motors are located here. The high-frequency signal is fed to the antenna from the magnetron generator of the transceiver unit.



Receiving and transmitting unit - generates powerful high-frequency pulses and converts high-frequency pulses reflected from the target into pulses of an intermediate frequency, and also performs preliminary amplification of signals at an intermediate frequency. It consists of a modulator that controls the operation of the magnetron generator; mixer (CM); preamplifier of intermediate frequency (PUPCH); and circuits for automatic frequency tuning of the klystron heterodyne (AFC). The target signal from the PUUPCH output is fed to the receiving unit.

The receiving unit must provide:

· Amplification of signals reflected from targets and converted into an intermediate frequency, their detection and delivery of amplified video signals to an indicator device, an auto-range finder and an antenna control unit;

· Selection of the amplification channel by range;

· Automatic gain control of the IF amplifier but the target signal (AGC);

· Automatic noise control of the amplifier; (BALL)

From the output of the receiving unit, video signals are fed to the following units:

· On the block of protection;

· Rangefinder;

· Antenna control unit;

The receiving unit includes:

Intermediate frequency amplifier,

Detector and video amplifier,

Cathode follower,

· Switch for automatic noise gain control (SPHERE).

AGC and SHARU systems

· The manipulator of reception, which unlocks the UHF only at the moment of arrival of positive pulses of the SHARU or positive pulses of the receive selector or positive strobe of pulses from the auto selector.

Indicator unit (combined review and auto tracking indicator); intended:

· - for visual detection of target marks;

- for aiming by determining by indicator:

1. angles in the vertical and horizontal planes, between the direction to the target and the longitudinal axis of the aircraft;
2. target range,
3. "launch zones".

The indicator unit uses an electro-ray tube of the "TEREM -1" type.

Scanner - controls the indicator and performs:

· Generation in the review mode of sweep voltages required to create a type B sweep indicator on the screen;

· Generation in the auto-tracking mode of sweep voltages required to create on the screen a sweep indicator of the "floating spot" type with the third coordinate - range;

· Generation of a voltage pulse, the duration and position of which is determined by the range scan and the "floating spot" mode on the screen "launch zone".

· Generation of unlocking pulses necessary for the normal functioning of the Terem-1 tube.

Antenna control unit provides:

· Decomposition of error signals in two mutually perpendicular azimuth and inclination planes.

· Amplification and transformation of the components of the error signals along the azimuth and tilt axes into control currents.

· Amplification and conversion of signals in tracking systems of remote antenna installation along the azimuth and tilt axes.

· Formation of search signals along the azimuth and inclination axes.

Antenna control unit consists of the following main elements:

Error signal extraction circuits,

Channel for generating control currents along the tilt axis in the search mode,

Channel for the formation of control currents along the azimuth axis in the search mode,

· Channel for generating control currents along the azimuth axis in the auto-tracking mode and remote installation (DU).

· A channel for generating control currents along the tilt axis in the auto-tracking and remote control mode.

The antenna control unit operates in three modes:

1.space view mode

2.the mode of automatic tracking of the target in the corners,

3. mode of remote installation of antennas, which consists in setting the antenna to a certain position when the sensor presses the "remote installation" (remote control) button.

In the auto-tracking mode, the input of the block receives:

· Amplitude-modulated video pulses, the modulation depth and phase of which depends on the position of the target relative to the equisignal zone.

· Reference sinusoidal voltages from the GON.

· Sinusoidal voltages from VT.

The control signal from the output of the antenna control unit is fed to the magnetic amplifier unit.

The block of magnetic amplifiers is designed to amplify the power of the antenna control signals. The amplified signals from the magnetic amplifier unit are fed to the azimuth motor and the antenna tilt motor.

The auto selector is intended:

· For automatic target search by range, followed by automatic tracking of one target captured by the autoselector.

· To indicate the moment of target acquisition and the transition of the radar to the auto-tracking mode.

· To unlock the receiver of the radar station for the time it is exposed to the signal reflected from the tracked target, i.e. to gate the receiver.

The auto selector consists of:

A temporary discriminator,

Fantastrona,

A slow saw generator,

Comparison schemes,

Strobe generator

· Capture schemes.

Autoselector operation is no different from typical autoselector circuits.

Video impulses of the target to the autoselector come from the receiving unit.

The output pulse gates the receiving unit.

The junction box is used to connect all units of the station to each other and to carry out numerous switchings that are necessary during the operation of the station.

The power supply is a stabilized power supply on board the aircraft, it is powered by a PO-1500 / 115V 400Hz / converter.

After a brief acquaintance with the main blocks of the station, which are no different from the same blocks in other radars, it is advisable to familiarize yourself with the features of the CD-30.

5. DEVICE FOR PROTECTING THE STATION AGAINST PULSE INTERFERENCE

This device provides:

1. Synchronization of the entire station.

2. Station performance in terms of availability:

- asynchronous impulse noise,
- synchronous impulse noise reflected from distant local objects and arriving at the second and third periods of the station operation.

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